emphasize that stenting can be an effective mode of treatment of persistent coronary artery and graft vasospasm.

*Pankaj Saxena, MCh, DNB*
*Igor E Konstantinov, MD, PhD*
*Mark A. J. Newman, FRACS*
*Department of Cardiothoracic Surgery*
*Sir Charles Gairdner Hospital*
*Nedlands, WA, Australia*

### References

1. Schena S, Wildes T, Beardslee MA, Lasala JM, Damiano RJ, Lawton JS. Successful management of unremitting spasm of the nongrafted right coronary artery after off-pump coronary artery bypass grafting. *J Thorac Cardiovasc Surg.* 2007;133:1649-50.
2. Saxena P, Konstantinov IE, Koniuszko M, Singh T, Newman MAJ. Persistent severe vasospasm in off-pump coronary artery bypass surgery: the value of intraluminal stenting. *J Thorac Cardiovasc Surg.* 2006;131:237-8.

doi:10.1016/j.jtcvs.2007.07.023

## Surgery of Ebstein anomaly

***To the Editor:***

I read with great interest the article by Quinonez and colleagues[1] concerning surgical treatment of the Ebstein anomaly. This very informative article underlines the role of the right ventricle in the outcome of this congenital anomaly. As my colleagues and I[2] pointed out almost 10 years ago, impairment of the right ventricle is a major prognostic factor after surgery for the Ebstein anomaly. Inasmuch as medical therapy is difficult to manage, it seemed to us that the association of a bidirectional cavopulmonary shunt (BCPS) would be helpful in the early follow-up period. This continues to be our policy.

The term used by the authors, "1.5-ventricle," does not seem to me to be adequate. The flow of the superior vena cava varies between one third and one half of the cardiac ouput.[3] The 1.5-ventricle concept is valid when one of the ventricles is anatomically partially deficient.

The article by Quinonez and associates does not answer a question that arises immediately: what are the indications for the BCPS? Their definition of "failing right ventricle" is not clear. In their series, 2 children were free of symptom, whereas, on the other hand, 3 adult patients were on the transplantation list. Right ventricular enlargement could be an indicator, but we are still looking for quantitative data. In a study of the right and left ventricular volumes before and after surgery, my colleagues and I[4] were unable to determine a threshold value for patients "at risk" and those that were "safe." In our experience, a large atrialized right ventricle (even if excluded after surgery), a very thin infundibular right ventricular wall, and/or a paradoxic septal motion are indications for a superior vena cava derivation. Among 105 patients with Ebstein repair and BPCS, we did not observe any deleterious effect of the shunt except for a transient swelling of the neck in 1 patient.

The BCPS does not solve all of the left and right ventricular problems. One of the patients in the authors' series is not improved and 2 in our own series had to undergo transplantation.

However, the associated anastomosis is an excellent additional procedure in patients with difficult indications.

*S. Chauvaud, MD*
*Cardiovascular Surgery Department*
*Hôpital Européen Georges Pompidou*
*Paris, France*

### References

1. Quinonez LG, Dearani JA, Puga FJ, O'Leary PW, Driscoll DJ, Connolly HM, et al. Results of the 1.5-ventricle repair for Ebstein anomaly and the failing right ventricle. *J Thorac Cardiovasc Surg.* 2007;133:1303-10.
2. Chauvaud SM, Fuzellier JF, Berrebi A, Lajos P, Marino JP, Mihaileanu S, et al. Bidirectional cavopulmonary shunt associated with ventriculo and valvuloplasty in Ebstein's anomaly: benefits in high risk patients. *Eur J Cardiothorac Surg.* 1998;13:514-9.
3. Seliem MA, Baffa JM, Vetter JM, Chen SL, Chin AJ, Norwood WI Jr. Changes in right ventricular geometry and heart rate early after hemi-Fontan procedure. *Ann Thorac Surg.* 1993;55:1508-12.
4. Chauvaud SM, Hernigou AC, Mousseaux ER, Sidi D, Hébert JL.Ventricular volumes in Ebstein's anomaly: x-ray multislice computed tomography before and after repair. *Ann Thorac Surg.* 2006;81:1443-9.

doi:10.1016/j.jtcvs.2007.06.036

***Reply to the Editor:***

My colleagues and I thank Dr Chauvaud for his comments and acknowledge the contribution of his team to the surgical treatment of Ebstein anomaly.

The use of the term "1.5-ventricle" was a semantic choice used to represent an operation, rather than a quantitative or physiologic descriptor. It is widely understood that diversion of blood flow by a bidirectional cavopulmonary shunt (BCPS) varies from one third to one half of the systemic venous return, depending on the patient's age.

To decide when to construct a BCPS, the surgeon has to use his or her judgment and experience and take into consideration the patient's clinical condition, echocardiographic data, magnetic resonance imaging data (if available), preoperative and intraoperative hemodynamic data, and the intraoperative morphologic appearance of the right ventricle. The status of the left ventricle is also very important. Our series is too limited to advise as to the specific indications of a BCPS in Ebstein anomaly, yet with further experience and follow-up these will become apparent. It is our impression that it is only needed in a few selected cases.

The term "failing right ventricle" is deliberately general. It may describe a right ventricle that cannot sustain the circulation after cardiopulmonary bypass; it may describe a right ventricle that is severely dysfunctional or dilated on echocardiography, magnetic resonance imaging, or intraoperative inspection; or it may describe a right ventricle with a large atrialized component, a thin wall, and paradoxical septal motion, as pointed out by Dr Chauvaud. In any of these circumstances, the patient may be free of symptoms. The underlying difficulty arises in the precise quantification of right ventricular function by the currently available methods. We are exploring the use of magnetic resonance imaging to better describe and quantitate the morphology and function of the right ventricle.

*Luis G. Quinonez, MD*
*University of Alberta Hospital*
*Edmonton, Alberta, Canada*

doi:10.1016/j.jtcvs.2007.07.018

## The conduct of experimental circulatory arrest: The search for clinical relevance

***To the Editor:***

I read with great interest the excellent laboratory study by Dr Ananiadou and colleagues[1] detailing the neuroprotective effect of profound hypothermia at 10°C after 75 minutes of circulatory arrest in an acute porcine model (N = 12). The described neuroprotective mechanism